REMARKS

Claims 1 and 3-19 are now pending in this application of which claims 1, 9, 11 and 15 are being amended, and claim 2 is being canceled.

Claims 1, 9, 11 and 15 are being amended to remove the word "process" from "process gas" to broaden the claim language as to non-structural features, so that "gas" can be proper antecedent basis for "cleaning gas" or "process gas". As defined in the Specification, gas includes both cleaning gas and process gas. (Specification, page 6, lines 5-7 and lines 30-35). The proposed amendment only makes express, a recitation of a feature that was already inherent in the original claim, and thus, is not a narrowing of the scope of the properly construed claim. *See eg*, TurboCare v. General Electric Co., 264 F.3d 1111 (Fed. Cir. 2001); Bose Corp. v. JBL, Inc., 274 F.3d 1354 (Fed. Cir. 2001); and Interactive Pictures Corp. v. Infinite Pictures, Inc., 274 F.3d 1371 (Fed. Cir. 2001).

The amended claims are include fully supported by the Specification and original claims and add no new matter. Thus entry of the claim amendments and reconsideration of the present case is respectfully requested.

The Examiner objected to the Drawings because they failed to include reference number 42 in Figures 1 and 2. Applicant is amending the Drawings to include this reference number, and also providing other amendments to include reference numbers, which were inadvertently left off the drawings.

Claim Rejections under 35 U.S.C. § 103(a)

1. The Examiner rejected claims 1-6 and 8 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,450,117 issued to Murugesh et al. in view of U.S. Patent No. 6,663,025 issued to Halsey et al. ("Halsey et al.").

In determining the differences between the prior art and the claims, the question under 35 U.S.C. § 103 is not whether the differences themselves would have been obvious, but whether the claimed invention as a whole would have been obvious. Stratoflex, Inc. v. Aeroquip Corp., 713 F.2d 1530, 218 USPQ 871 (Fed. Cir. 1983); Schenck v. Nortron Corp., 713 F.2d 782, 218 USPQ 698 (Fed. Cir. 1983). To establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Further, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on Applicants' disclosure. In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

The references cited by the Examiner do not teach or suggest, or motivate the derivation of, claim 1 which is to a gas distributor comprising, inter alia, a baffle with opposing first and second surfaces, and with a plurality of first vanes located on the first surface and a plurality of second vanes are on the second surface of the baffle. The first vanes are configured to direct the process gas expelled from the first terminus across a chamber surface. Each first vane comprises an arcuate plate that curves outward from the hub to the outer perimeter of the baffle. The second vanes are configured to direct the process gas expelled from the second terminus across the second surface of the baffle to clean the gas distributor.

Murugesh et al. is commonly assigned and has a common inventor with the present application. Murugesh et al. describes a substrate processing chamber comprising a first gas distributor that can provide process gas to the chamber to process the substrate, and a second gas distributor for directing a remote energized cleaning gas preferentially across a side wall or ceiling in the chamber to clean the surface. (Abstract)

As acknowledged by the Examiner, Murugesh et al. does not teach second vanes on the second surface of the baffle that direct the received gas across the second surface of the baffle.

However, not only does Murugesh et al. not teach the second vanes on a second surface of the baffle, but more importantly, Murugesh et al. does not teach a gas distributor having a combination of a plurality of first vanes located on a first surface of the baffle, and a plurality of second vanes are on the second surface of the baffle which have a different function than the first vanes, namely, that the second set of vanes are configured to direct the process gas expelled from the second terminus across the second surface of the baffle to clean the gas distributor. Nor does Murugesh et al. teach or suggest the advantages that can be obtained from a gas distributor having two sets of vanes on opposing surfaces, with one set of vanes having a structure adapted to clean residues formed on the process gas distributor itself.

A gas distributor which has a set of vanes that direct process gas from a second terminus across a surface of the gas distributor itself, to clean the surface, is simply not taught by Murugesh et al. Instead, Murugesh et al. teaches a gas distributor having a single surface 215 with ridges 245 which direct cleaning gas across the sidewall and ceiling of the chamber to clean the chamber surfaces, and not the surface of the gas distributor itself. Murugesh et al., also does not teach the advantages of

having a self-cleaning gas distributor, and instead teaches only a gas distributor which flows gas across chamber surfaces to clean these surfaces:

> In one version, the cleaning gas distributor 215 directs a flow of the cleaning gas in one or more regions of, or across surfaces of, the chamber 30. The chamber regions typically have, for example, higher concentrations or thicker deposits of process residues, more difficult to clean process residues, or where excessive accumulation of process residues is harmful for subsequent wafer processing steps, for example, because the residues can flake off and contaminate the substrate 25. The chamber surfaces may include, for example, a surface of one of the chamber walls 45, 50 or ceiling 55, or the surface of a component in the chamber 30, such as for example, a surface of the support 40. (Murugesh et al., Col. 5, lines 46-57.)

Thus, one of ordinary skill upon reading Murugesh et al. would not have any motivation to derive the claimed self-cleaning gas distributor which has a set of vanes directed solely to clean a surface of the gas distributor itself, based on the teachings of Murugesh et al.

Halsey et al. fails to make up for the deficiencies of Murugesh et al. because Halsey et al. also does not teach or suggest a gas distributor comprising a combination of first vanes on the first surface of the baffle, and a plurality of second vanes on a second surface. Halsey et al. teaches a gas distributor that is adapted to slowdown the flow of gas into the chamber so that the gas flows out into the open space of the chamber with a slower velocity. (Column 2 lines 52-57). Halsey et al. teaches a diffuser with a single set of vanes on one surface and flat and smooth surface without vanes on the opposing side of the diffuser. (Halsey et al., Figures 4A and 4B.)

Moreover, Halsey et al. makes no mention of the distributor being self-cleaning or capable of directing the expelled process gas across the surface of the baffle to clean the gas diffuser. Instead, the diffuser in Halsey et al. is "used to vent gas into a chamber or pump the gas out of a chamber to provide a vacuum condition."

(Halsey et al., Col. 7, lines 42-44.) Halsey et al. does not teach the basic structure of a set of first vanes configured to direct the process gas expelled from the first terminus across a chamber surface, and a set of second vanes configured to direct the process gas expelled from the second terminus across the second surface of the baffle to clean the gas distributor.

Thus neither Murugesh et al. nor Halsey et al. provide any teachings or suggestions that would cause one of ordinary skill in the art to derive an invention which has two sets of vanes on opposing surfaces of a single gas distributor which are each adapted to perform a function. Consequently, the combination of Murugesh et al. and Halsey et al. do not teach or suggest claim 1 as a whole. Nor do either of these references provide motivation to derive a structure comprising a gas distributor having a baffle and a plurality of first vanes on one surface, and second vanes on the another surface of the baffle, the second vanes configured to direct the process gas expelled from the second terminus to clean the gas distributor.

Furthermore, the Examiner has not cited any reason why one of ordinary skill in the art would combine Murugesh et al. and Halsey et al., both deficient to specific elements of the present invention, to derive additional elements not taught by either reference to teach the gas distributor recited in claim 1. There is simply no motivation cited to create the present invention, other than that obtained in hindsight from the disclosure of Applicants' own Specification.

Further, as explained in the Specification, the claimed gas distributor has specific advantages derived from the structure of first vanes comprising arcuate plates that curve outward from the hub to the outer perimeter of the baffle on one of its surfaces, and second vanes that flow gas expelled from the second terminus across the second surface of the baffle. The flow of gas directed by the second vanes across the second surface of the baffle cleans this surface; and thus, the claimed gas distributor is self-cleaning. This self-cleaning action is especially useful as the second surface is especially susceptible to the build-up of process residues because it generally faces the

substrate in the chamber, and thus, is more proximate to the process zone in which such processes residues are formed. The structural feature of the first and second vanes provides a significant advantage over prior art gas distributors which allow build-up of residues on surfaces exposed to the plasma or process gas environment in the chamber. The combination of Murugesh et al. and Halsey et al. simply does not provide any suggestion or motivation that would allow one of ordinary skill in the art to derive the advantages of a gas distributor structure having first and second vanes on opposing surfaces, as recited in claim 1.

For these reasons, the combination of Murugesh et al. and Halsey et al. do not teach or suggest claim 1 or the claims dependent therefrom.

2. The Examiner further rejected claims 1, 3 and 4 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,450,117 issued to Murugesh et al. in view U.S. Patent No. 5,643,394 issued to Maydan et al. ("Maydan et al.").

Claims 3 and 4 depend upon claim 1 and are patentable for the same reasons as claim 1.

Murugesh et al. does not render claim 1 obvious, as the cited references do not teach or suggest a gas distributor comprising both a first set of vanes on a first surface, and a second set of vanes on the second surface. Nor does Murugesh et al. teach the different functions of the first and second vanes, namely, a first set of vanes that direct gas expelled from the first terminus across a chamber surface, and a second set of vanes configured to direct the process gas expelled from the second terminus across the second surface of the baffle to clean the gas distributor. Murugesh et al. also does not teach or suggest the advantages that can be obtained from a gas distributor having two sets of vanes on opposing surfaces, with one set of vanes having a structure adapted to clean residues formed on the process gas distributor itself, while the other vanes clean the chamber surfaces.

Maydan et al. fails to make up for the deficiencies of Murugesh et al. because Maydan et al. also does not teach or suggest the combination of a plurality of first vanes on the first surface of the baffle to clean chamber surfaces, and a plurality of second vanes on the second surface of the baffle that direct the gas expelled from the second terminus across the second surface of the baffle to clean the gas distributor. Murugesh et al. teaches a gas distributor adapted to direct a cleaning gas against side wall and ceiling of the chamber. Murugesh et al. does not teach a gas distributor having a set of vanes that direct cleaning gas against chamber surfaces. In fact, Murugesh et al. does not teach two sets of vanes and only teaches a single set of vanes on the bottom side of the gas distributor with a flat and smooth upper surface on the same distributor. The upper side of the gas distributor as taught by Maydan et al. is also flat and smooth as shown in the figures.

Furthermore, the Examiner acknowledges that neither Murugesh et al. nor Maydan et al. teach second vanes to direct cleaning gas against a second surface of a baffle to clean a gas distributor:

> Though Murugesh et al. in view of Maydan et al. do not explicitly teach that second vanes direct the cleaning gas across the second surface of the baffle to clean the distributor, the same is a functional limitation, and the apparatus of prior art is considered capable of the same since it meets the functional limitation of the claim, especially that gas flow at the second surface of the baffle plate can be controlled by optimizing the angle of angular reflectors on the second surface of the baffle 10.

[Emphasis added]. The Examiner also states:

> Maydan et al. teach a gas inlet apparatus ... where the gas flow along the second surface of baffle can be controlled by optimizing the angle of annular reflectors ...

However, an obviousness analysis should not be based on how a structure taught by a reference can be altered to meet the structure taught by Applicants' claim. Even though the gas flow along the second surface of baffle can be

controlled by optimizing the angle of the reflectors, nowhere does Maydan et al. teach that their angle or other features should be controlled is such a way so that the gas distributor is self-cleaning. Murugesh et al. also does not teach providing gas vanes that are adapted to provide a self-cleaning gas distributor. Thus the motivation for setting the angle of the reflectors in Maydan et al., or providing a new set of vanes having a new function for the gas distributor taught by Murugesh et al., must be entirely derived from Applicants' disclosure. Such a hindsight derivation of the invention based upon Applicants' own disclosure does not support an obviousness rejection.

For these reasons, claims 1, 3 and 4 are not obvious over Murugesh et al. in view of Maydan et al.

3. The Examiner further rejected claim 7 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,450,117 issued to Murugesh et al. in view U.S. Patent No. 6,663,025 issued to Halsey et al. ("Halsey et al.") as applied to claim 1 and further in view of U.S. Published Application No. 2003/0116278 issued to Wheat et al.

As acknowledged by the Examiner, Murugesh et al. in view of Halsey et al. do not teach that second vanes that comprise plurality of wedges as recited in claim 7. Further, claim 7 depends upon claim 1 and is patentable for the same reasons as claim 1, namely that Murugesh et al. in view of Halsey et al. do not teach or suggest a gas distributor comprising a combination of a first set of vanes on a first surface and a second set of vanes on the second surface.

Wheat et al. fails to make up for the deficiencies of Murugesh et al. and Halsey et al. because Wheat et al. also does not teach or suggest a combination of a plurality of first vanes on the first surface of the baffle, and a plurality of second vanes on the second surface of the baffle that direct the gas expelled from the second terminus across the second surface of the baffle to clean the gas distributor. Instead, Wheat et al. teaches a gas baffle having a smooth top and bottom surfaces without any vanes. (Wheat et al., Figs. 1 and 2.) Wheat et al. also does not teach a baffle

comprising a first surface with "first vanes comprising arcuate plates that curve outward from the hub to the outer perimeter of the baffle on the first surface of the baffle", as recited in claim 1. Nor does Wheat et al. teach second vanes on the second surface of the baffle that comprise a plurality of wedges, as recited in claim 7, or the advantages of the same, namely a self-cleaning baffle. Thus, Wheat et al. is also deficient because the gas distributor of Wheat et al. is not taught to have a self-cleaning structure. Wheat et al. makes no mention of the gas distributor being able to pass a gas along a surface of the distributor to clean such surface.

For these reasons, the combination of Murugesh et al., Halsey et al. and Wheat et al. do not provide any suggestion or motivation to derive the gas distributor of independent claim 1 or dependent claim 7. Thus, claim 7 is patentable over Murugesh et al. in view of Halsey et al. and Wheat et al.

4. The Examiner rejected claims 9 and 15-19 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,450,117 issued to Murugesh et al. in view of U.S. Patent No. 6,663,025 issued to Halsey et al. as applied to claim 1 and further in view of U.S. Published Application No. 2004/0200412 issued to Frijlink.

Claim 9 depends upon claim 1 and is patentable for the same reasons as claim 1, namely Murugesh et al. in view of Halsey et al. does not render claim 1 obvious, as the cited references do not teach or suggest a gas distributor comprising a combination of sets of first vanes and sets of second vanes.

Frijlink further fails to make up for the deficiencies of Murugesh et al. and Halsey et al. because Frijlink also does not teach or suggest a plurality of first vanes on the first surface of the baffle, and a plurality of second vanes on the second surface of the baffle which direct the process gas expelled from the second terminus across the second surface of the baffle to clean the gas distributor. Instead, Frijlink teaches a process chamber with isolation means to "prevent the reactive gases from flowing into spaces of the reactor other than the space immediately above the substrate holders and

the wafers." (Frijlink, paragraph [0027], lines 1-4). Frijlink does not teach or suggest a plurality of first vanes on the first surface of the baffle, and a plurality of second vanes on the second surface of the baffle that direct the process gas expelled from the second terminus across the second surface of the baffle to clean the gas distributor.

For these reasons, claim 9 is not obvious over Murugesh et al., in view of Halsey et al., and further in view of Frijlink et al.

Claim 15

Murugesh et al., Halsey et al. and Frijlink et al. do not teach claim 15 which recites, inter alia, a plurality of first vanes on the first surface of the baffle, the plurality of first vanes configured to direct the process gas expelled from the first terminus across the enclosing walls and interior chamber surfaces, each first vane comprising an arcuate plate that curves outward from the hub to the outer perimeter of the baffle; and a plurality of second vanes on the second surface of the baffle, the plurality of second vanes configured to direct the process gas expelled from the second terminus across the second surface of the baffle to clean the gas distributor, for the same reasons as presented above with respect to claim 1.

Thus for at least the same reasons as presented for claim 1, independent claim 15 and the claims dependent therefrom are patentable over Murugesh et al. in view of Halsey et al. and Frijlink.

5. The Examiner rejected claim 10 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,450,117 issued to Murugesh et al. in view of U.S. Patent No. 6,663,025 issued to Halsey et al. as applied to claim 1 and further in view of U.S. Patent No. 6,132,512 issued to Horie et al.

Claim 10 is to a combination process and cleaning gas distributor comprising the gas distributor according to claim 1. The process gas distributor has a process gas inlet and a showerhead gas distribution faceplate. Claim 10 is dependent on claim 1, and is patentable over the combination of Murugesh et al. and Halsey et al., because, as discussed above, these references do not teach or suggest a gas distributor comprising plurality of first vanes on the first surface of the baffle, and a plurality of second vanes on the second surface of the baffle that direct the process gas expelled from the second terminus across the second surface of the baffle to clean the gas distributor, as in amended claim 1.

Horie et al., however, fails to make up for the deficiencies of Murugesh et al. and Halsey et al. because Horie et al. also does not teach or suggest a baffle having first vanes on the first surface of the baffle and second vanes on the second surface of the baffle. Halsey et al. also does not teach that the second vanes are configured to direct process gas across the second surface of the baffle to clean the distributor. Instead, Horie et al. teaches "a gas ejection head for use in a vapor-phase thin-film growth apparatus, comprising a planar nozzle head body having a plurality of nozzle orifices for uniformly ejecting a film deposition therethrough." (Horie et al., Col. 4, lines 54-57.) Horie et al. further teaches:

> "...the gas injection head includes a nozzle head body 20 which comprises a disk 21 having a plurality of parallel fitting grooves 21a defined in an upper surface thereof and a plurality of parallel fitting grooves 21a defined in a lower surface thereof. The fitting grooves 21a defined in the upper and lower surfaces of the disk 21 extend perpendicularly to each other. Slender liquid passage members 22, each having a channel-shaped cross section defining a liquid passage groove 23, are fitted in the respective fitting grooves 21a defined in the upper and

lower surfaces of the disk 21, with the liquid passage grooves 23 opening toward the bottoms of the fitting grooves 21a."

(Horie et al., Col. 8, line 59 to Col. 9, line 3 and Fig. 8A, 8B and 8C.)

Thus, Horie et al. does not teach or suggest even a baffle having first vanes on the first surface of the baffle and second vanes on the second surface of the baffle, as in claim 1.

For at least these reasons, claim 10 is patentable over Murugesh et al. in view of Halsey et al. and Horie et al.

6. The Examiner rejected claims 11-14 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,182,602 issued to Redeker et al. in view of U.S. Patent No. 6,450,117 issued to Murugesh et al., U.S. Patent No. 6,663,025 issued to Halsey et al., and U.S. Published Application No. 2004/0200412 issued to Frijlink.

The combination of Redeker et al., Murugesh et al., and Halsey et al., and Frijlink et al. do not teach claim 11 which is to a self-cleaning gas distributor to distribute a process gas from an external source across surfaces in a substrate processing chamber having a wall with a cavity.

As acknowledged by the Examiner, Redeker et al. does not teach a gas distributor having a first channel along external surface of hub; a baffle plate extending radially outward from the hub, the baffle plate comprising first and second surface, an outer perimeter, and an aperture capable of allowing passage of the gas along the second channels; a plurality of first vanes on the first surface of the baffle plate, each first vane comprising an arcuate plate that curves outward from the hub, a plurality of second vanes on the second surface of the baffle plate, each second vane comprising a surface inclined to the second surface of the baffle plate; whereby the first vanes direct the gas across the surfaces of the chamber, the second vanes direct the gas across the second surface of the baffle plate, and the a gas feed-through tube that allows the gas to by pass the first and second set of vanes.

As further acknowledged by the Examiner, Redeker et al. in view of Murugesh et al. does not teach second vanes on the second surface of the baffle and where second vanes direct the received gas across the second surface of the baffle.

Halsey et al. fails to make up for the deficiencies of Redeker et al. and Murugesh et al. because Halsey et al. does not teach or suggest a baffle having first vanes on the first surface of the baffle and second vanes on the second surface of the baffle, as discussed above. Instead, Halsey et al. teaches a diffuser with guide vanes on the surface of one side of the diffuser and a smooth and flat surface on the opposing side of the diffuser.

Frijlink fails to make up for the deficiencies of Murugesh et al., and Halsey et al. because Frijlink also does not teach or suggest a baffle having first vanes on the first surface of the baffle and second vanes on the second surface of the baffle. Instead, Frijlink teaches a chamber with isolation means to prevent the reactive gases from flowing into spaces of the reactor other than the space immediately above the substrate holders and the wafers. Thus, Frijlink does not teach or suggest a baffle having first vanes on the first surface of the baffle and second vanes on the second surface of the baffle, nor does Frijlink teach a plurality of second vanes configured to direct the process gas expelled from the second terminus across the second surface of the baffle plate to clean the gas distributor, as in claim 11.

For these reasons, independent claim 11 and the claims dependent therefrom, claims 12-14, are patentable over Redeker et al. in view of Murugesh et al., Halsey et al. and Frijlink.

CONCLUSION

For the foregoing reasons, allowance of the present claims is respectfully requested. Should the Examiner have any questions regarding the above amendments or remarks, the Examiner is requested to telephone Applicant's representative at the number listed below.

Respectfully submitted,

JANAH & ASSOCIATES, P.C.

Date: August 10th, 2007

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